Beach wrack as a potential natural resource in the South-Eastern Baltic

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Beach wrack (BW) – biological marine materials as algae, sea grasses and other, which are thrown from the sea to the seashore, becoming a polluter and cause of inconvenience. Problem of BW is present in the Kaliningrad Oblast of Russia, South-Eastern Baltic. From time to time, large amounts of BW appear in various places along its seashore. However, BW can be used as an organic resource, so nuisance could be converted into resource and asset. The study on BW spatial and quantitative distribution and its potential use in the South-Eastern Baltic is carried out within the Project #R090 CONTRA of the Interreg Baltic Sea Region Programme and accompanied by researches of algae species composition basing on partly support of the State assignment of IO RAS (Theme No. 0149-2019-0013).

An observation of the Baltic seashore within the Kaliningrad Oblast was carried out in March-December 2019 with the aim of quantity and quality characteristic of BW emissions. The BW emissions were recorded (measured, described and geo-referenced using GPS navigation) and sampled on two model sites monthly and the alongshore survey was carried out seasonally. Monitoring of the time of residence of the BW emissions was carried out three times per day at the selected model site using a web camera. It was found that the distribution of BW was characterized by significant spatial and temporal variability. In general, large amounts of BW emissions were observed on the northern coast of the Sambian Peninsula, in contrast to the western coast and Curonian and Vistula spits. The largest accumulations of BW were local and mainly near the coastline protrusions as capes (natural) and breakwaters, slipways, bunes (man-made). The time of residence of BW storage varied greatly and was often limited to a few days. Their further transformation could be carried out in several ways - by flushing back to the sea, covering under the thickness of sand or small pebbles, and a wind-wave dispersal along the beach. BW mainly contains Rhodophyta algae in the early spring and autumn-winter periods, in contrast to summer, when there are also Chlorophyta and Phaeophyta.

The preliminary estimations show that the industrial use of BW is limited by the spatial and temporal irregularity of their emissions in the Kaliningrad Oblast. However, the problem of BW collection and utilization exists. A possible solution could be use of BW for coastal protection greenery as nutrients that is similar to a natural process. These experiments were initiated in the Curonian Spit National Park in 2019. In this way BW could be involved in soft engineering techniques to manage the coastline.